

RETRACTABLE SHELF FOR THE CABINET OF A REFRIGERATION APPLIANCE

Field of the Invention

The present invention refers to a retractable shelf to  
5 be used inside the cabinets of refrigeration appliances, such as refrigerators, for allowing the user to selectively displace the shelf between at least one lower operative position and a retracted upper operative position.

10 Prior Art

The shelves used inside the cabinets of refrigerators and freezers are generally defined by horizontal panels constructed in different materials and which are laterally seated on supports provided on the  
15 internal lateral walls of the cabinet.

In many of the known constructive solutions, the cabinets are laterally provided with different levels of internal supports, so as to allow the shelves to have their vertical positioning adjusted, as a  
20 function of the products to be refrigerated in the interior of the cabinet.

While the known height adjusting systems give certain flexibility to the user regarding the assembly of the shelves as a function of each standard of use of the  
25 refrigeration appliance, there are situations in which the known height adjustments do not comply with the user's needs, which can last few hours or some days.

In some cases, in which the need of having a larger free gap available between two shelves is restricted  
30 to only a certain area, such as the frontmost region of the shelves, there is no need for a larger free height in the rear region. In these cases, the known constructions, in which each shelf is defined in a single panel, require the user to remove one of the  
35 shelves from the cabinet to obtain the necessary free

gap, even if the need for a larger height between both shelves is only directed to a reduced surface area of these parts that form a refrigerating cabinet.

There are known from the art the shelves with a

5 reduced depth, which allow the user to obtain a larger vertical free gap in the front region of the whole shelf disposed immediately below the narrower shelf. However, this construction unnecessarily reduces the total support area of the shelves when there is not a

10 momentary or constant need for the larger partial free gap, which is obtained by using a narrower shelf. Furthermore, if a larger vertical free gap over the total area of a shelf is needed, even the narrower shelf has to be removed from the interior of the

15 cabinet. The temporary removal of one or more shelves is uncomfortable for the user, besides producing an additional component which has to be adequately stored during the time of the operational condition that caused its removal.

20 Another known construction is described in Brazilian patent BR PI0104847-3 and comprises a shelf formed by two superiorly coplanar flat frames, one being the front frame and the other the rear frame, the front frame being displaced between a whole shelf position

25 and a reduced shelf position, in which both frames in an overlapped condition can be angularly displaced upwardly backwardly to a vertical retracted position, in which they remain seated or adjacent to the internal rear wall of the cabinet.

30 While leading to a great operational versatility, allowing the shelf to have its depth varying from a maximum value to a reduced value, usually about half the maximum depth, and from this reduced value to a null value, this construction is complex and

35 expensive, making its application difficult and

restrictive.

Documents US 4,528,825 and JP 2000371013 disclose a retractable shelf, which is maintained laterally suspended by two pairs of arms (larger or smaller) in  
5 a parallelogramic arrangement. The shelf can be thus displaced between at least one lower operative position, disposed below the plane of articulation of the arms to the cabinet, and an upper operative position, in which the shelf is conducted to a  
10 position generally adjacent to a shelf or a wall immediately above the cabinet.

These prior constructions require the assembly of suspending elements hinged to the internal lateral walls of the cabinet, which also conducts to complex  
15 and expensive constructions, limiting the use thereof.

Objects of the Invention

It is a generic object of the present invention to provide a retractable shelf for the cabinet of a refrigeration appliance, presenting a simple  
20 construction with a relatively low cost and which allows, through an easy and fast operation, the shelf to be manually displaced between at least one lower operative position, defining a storage free gap in relation to a shelf or a dividing wall disposed  
25 immediately above, and an upper operative position, in which it is conducted to be positioned in a higher level, reducing or annullating the height of said storage free gap defined above said retractable shelf.

Summary of the Invention

30 This and other objects are attained through a shelf for the cabinet of a refrigeration appliance, such as a refrigerator or freezer, said shelf having each lateral edge slidably mounted, by two longitudinally spaced apart seating regions, on respective rail  
35 portions affixed to opposite internal lateral walls of

the cabinet, in order to be selectively displaced between at least one lower operative position and one transitional intermediary position, in which it is upwardly and forwardly displaced, and also between 5 said transitional operative position and an upper operative position, in which it is backwardly displaced, situated above and vertically spaced from the lower operative position.

The construction of the rail portions is made so that 10 the shelf is displaced from the lower operative position to the upper operative position, when it is forwardly pulled by the user, until reaching the transitional intermediary position, and then backwardly pushed to the upper operative position. The 15 displacement of the shelf back to the lower operative position is accomplished by movements which are inverted in relation to those described above.

Brief Description of the Drawings

The invention will be described below, with reference 20 to the enclosed drawings, given by way of example of a preferred embodiment and in which:

Figure 1 is an upper perspective view of the present shelf mounted on the respective rail portions and which is illustrated in the lower operative position; 25 Figure 2 is a front elevational view of the assembly illustrated in figure 1;

Figure 3 is a perspective view similar to that of figure 1, but illustrating the shelf in the upper operative position;

30 Figure 4 is a front elevational view of the assembly illustrated in figure 3;

Figure 5 is an internal lateral view of two rail portions constructed in a single piece to be mounted on each of the opposite internal lateral walls of the 35 cabinet;

Figure 6 is an exploded front perspective view, illustrating part of the internal rear wall and part of one of the internal lateral walls of a cabinet, as well as the two respective rail portions, as defined  
5 in figure 3; and

Figure 7 is a view similar to that of figure 6, but illustrating the two rail portions already mounted to the respective internal lateral wall of the cabinet.

Detailed Description of the Invention

10 As illustrated and previously mentioned, the present shelf is of the type used in the interior of a cabinet 10 of refrigeration appliances, particularly refrigerators, said cabinet 10 comprising, in its internal box, a rear wall 11, and two opposite lateral  
15 walls 12, only one being illustrated in figures 6 and 7.

In the illustrated construction, each lateral wall 12 of the internal box of the cabinet 10 is provided with holes 12a, arranged according to the arrangement of  
20 the internal distribution of the refrigerator shelves and in which the rail portions or other supports for mounting the internal components of the cabinet are secured. The internal lateral hole assembly of the lateral walls of the cabinet 10 is object of a co-  
25 pending patent of the same applicant and will not be described in greater details herein.

According to the invention, the present shelf 20 comprises a generally flat frame, with a substantially rectangular contour and which is constructed in a  
30 plastic material or any other adequate simple or composite material.

The shelf 20 is constructed in such a way as to present, on each of its lateral edges 21, two seating regions 22 longitudinally spaced from each other and  
35 which project slightly outwardly from the contour of

the shelf 20, to be slidingly mounted on supports provided on the lateral walls 12 of the internal box of the cabinet 10, as described ahead.

- The seating regions 22 can be positioned on a plane coinciding or not with the plane of the shelf 20. In the illustrated construction, the seating regions 22 are defined by pins coplanar to each other, but which are incorporated externally to respective pending lateral flaps 24, incorporated to the shelf 20 and which define portions of the lateral edges 21 of the latter. This construction makes the seating regions 22, in the form of pins, to be disposed on a plane quite inferior to that of the upper face of the shelf 20, as better illustrated in figure 2 and 4.
- For the shelf 20 to be displaceable inside the cabinet 10, each seating region 22 is slidingly mounted on a respective rail portion 30 secured to a respective lateral wall 12 of the internal box of the cabinet 10 by any adequate means, or it can even be incorporated, in a single piece, to the structure of the internal box in a position predetermined in the project. However, the fixation of each rail portion 30 to the cabinet 10 is preferably made by fitting and retaining fixation means 31, which can take the form of external orthogonal projections of the rail portions 30 to be fitted in respective holes 12a made in the lateral walls 12 of the internal box of the cabinet 10.
- In the illustrated construction, each rail portion 30 comprises a forwardly upwardly inclined lower rail extension 32, with the lower end 32a being closed and defining the position in which the respective seating region 22 of the shelf 20 is maintained seated in the lower operative position of the shelf 20, and an open upper end 32b. An upper rail extension 33 is further provided, disposed generally horizontally and having a

rear end 33a disposed vertically aligned in relation to the lower end 32a of the lower rail extension 32, and a front end 33b opened to the interior of the upper end 32b of the lower rail extension 32.

- 5 The lower rail extension 32 and the upper rail extension 33 generally take the form of channels with a "U" shaped cross section, with the bottom wall seated against a respective lateral wall 12 of the internal box of the cabinet 10, said channels having  
10 the width dimensioned to allow the guided sliding of the respective seating region 22 of the shelf 20.

According to the illustrated construction, the two rail portions 30 positioned on each side of the shelf 20 are formed in a single piece, with the rear end 33a  
15 of the upper rail extension 33 of the rail portion 30, which is more forwardly disposed, being incorporated to the front end 33b of the upper rail extension 33 of the rail portion 30 which is disposed behind the other rail portion by means of an intermediary rail  
20 extension 34. The lower rail extension 32 and the upper rail extension 33 of each rail portion 30 are united to each other, in a single piece, by a closing wall 35 normally incorporated and which is coplanar to the free edge of the lateral walls of the channels  
25 that define said rail extensions.

With the construction described above, when the shelf 20 is in a lower operative position, the seating regions 22 thereof in the form of pins remain seated on the closed lower ends 32a of the respective lower  
30 rail extensions 32, as illustrated in figures 1 and 2. When the shelf 20 is forwardly pulled by the user, it has its seating regions 22 upwardly conducted, along the lower rail extensions 32, until they reach the upper end 32b of the latter, when the shelf 20  
35 occupies a transitional intermediary position, in

which it is forwardly upwardly displaced in relation to the lower position and from which the shelf 20 can be horizontally backwardly displaced, with its seating regions 22 sliding along the upper rail extensions 33

5 until reaching an upper operative position, situated above and vertically spaced from the lower operative position, as illustrated in figures 3 and 4. In the illustrated constructive example, the lower and upper operative positions are vertically aligned.

10 In the illustrated construction, the shelf 20 can occupy only the lower and upper operative positions, since the lower rail extensions 32 do not present intermediary regions configured to retain the respective seating regions 22 of the shelf 20. It

15 should be understood that this constructive variation is possible, provided that the inclined lower rail extensions 32 are medianly provided with at least one housing (not illustrated), in which the respective seating region 22 of the shelf 20 can be seated, for

20 allowing the shelf 20 to be maintained in other operative positions in which it remains in the horizontal, or forwardly downwardly inclined, or forwardly upwardly inclined, depending on the positioning of the seating regions 22 along the

25 respective lower rail extensions 32.

In the illustrated embodiment, the upper rail extensions 33 are horizontal, making the transitional intermediary position to be substantially reached in the same level of the upper operative position.

30 However, it is possible to construct the upper rail extensions 33 backwardly upwardly inclined, whereby the transitional intermediary position of the shelf 20 would be defined in an intermediary level between the lower and rear operative positions. The transitional

35 intermediary position could be further associated with

another lower operative position, provided that the joining region of the lower rail extension 32 and the upper rail extension 33 is configured for allowing the corresponding seating region 22 of the shelf 20 to be  
5 operatively seated thereon.

In order to improve the stability of the shelf 20 in the upper operative position, each upper rail extension 33 has its rear end 33a provided with a lower recess 33c, which is configured and dimensioned  
10 to define a concave cradle to receive a respective seating region 22 in the form of a pin of the shelf 20.

Each pair of rail portions 30 in a single piece incorporates a front rail extension 36, horizontally  
15 leveled and associated with the adjacent upper rail extension 33, as if it were a continuation of the latter, and having an open front end for allowing the initial fitting for assembling the seating regions 22 of the shelf 20 on the rail portions 30.

20 In order to prevent the shelf 20 from having its front seating regions 22 inadvertently pulled outwardly from the front rail portions 30 upon passing along the transitional intermediary position, the front rail extensions 36 are internally provided with a stop  
25 means 37 in the form of a latch, which is cut from the lower wall of the respective rail channel and which, by action of a small slide 38, can occupy an inoperative position, liberating the passage of the seating regions 22 of the shelf 20 along the front rail extensions 36, or an operative position, in which it prevents the seating regions 22 of the shelf 20  
30 from passing along the front rail extensions 36.

The upper operative position of the shelf 20 can be projected to reduce only the storage free gap located  
35 above said shelf, consequently increasing the storage

free gap of the shelf disposed immediately below. However, the present arrangement can be designed and mounted in the cabinet 10 so that, in the upper operative position, the shelf 20 is retracted to a 5 position defined close to the lower face of another shelf or dividing wall disposed immediately above the retractable shelf.

While only one embodiment of the invention has been illustrated, it should be understood that changes in 10 the form and arrangement of the components could be made, without departing from the constructive concept defined in the appended claims.